

Application No.: 10/761086

Case No.: 58509US002

Remarks

Favorable reconsideration of this application in the light of the amendments and the following discussion is respectfully requested. Claims 1, 3, 9, 10, and 11 have been amended to more clearly define the invention. Claims 1-11 remain pending in this application for consideration.

Objections

Claims 1 and 3 were objected to because of the use of acronyms in the claims. Applicants have amended the claims by inserting the complete terminology as suggested by the Examiner. Withdrawal of the objection is respectfully requested.

Claim Rejections under 35 USC § 101 and §112

Claims 9 and 10 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner indicated that a claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 9 and 10 were rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101.

Applicants submit amended claim 9 and 10 for reconsideration. The claims have been amended to address the concerns raised by the Examiner under 35 USC § 101 and §112. The use of conventional method claiming terminology in amended claims 9 and 10 and the recitation of a process step in amended claim 9 render the claims definite. Applicants aver that the amended claims distinctly point out the subject matter of the present invention. Reconsideration of the amended claims and the withdrawal of the rejections under 35 USC § 101 and §112 is respectfully requested.

Claim Rejections under 35 USC § 103

1. Claims 1-11 were rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over McCarthy et al (U. S. patent No. 5,955,556).

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Regarding the limitation of parent claim 1, the Examiner averred that McCarthy et al disclose the preparation of a stable aqueous self-dispersible fluorinated copolymer dispersion of up to 48% polymer solids in water in the absence of surfactant due to improved conversion rate of monomer to polymer. According to the Examiner, McCarthy et al further disclose during polymerization process, fluoropolymer macromolecules that are produced having inorganic, "surfactant-like" functional end groups which impart excellent latex stability to the polymer even these end groups are present in very low concentration. The Examiner further noted that McCarthy et al furthermore disclose that various types of commercially available surfactants may be optionally added, it may include non-ionic, anionic or cationic type surfactants, and it also may be fluorinated or non-fluorinated. With respect to the claimed particle size of 10-400 nm, the Examiner stated that McCarthy et al have disclosed that mono-dispersed particles with a narrow distribution on size of 0.1-0.4 micron are obtained.

However, the Examiner acknowledged that the reference is silent of the specific properties such as VTT of said fluoropolymer dispersion being at least 26° C. According to the Examiner, in light of the fact that the prior art and the present invention recite (a) substantially identical polymer composition and (b) obtaining the same type of emulsion polymerization process, a reasonable basis exists to believe that the products of the invention inherently possess the same properties. Since the PTO does not have proper means to conduct experiments, the burden of proof is now shifted to applicants to show otherwise.

Regarding claim 2, the Examiner stated that non-ionic and non-fluorinated surfactants such as alkylpolyoxyethylene alcohols are included optionally by McCarthy et al. Its structure does read on the claimed formula (I) when m is 0, R¹ is alkyl and R³ is hydrogen.

The Office Action further refers to some of the dependent claims as follows:

Regarding claim 3, since the same non-ionic and non-fluorinated surfactants are used, they will carry the same or similar HLB values.

Regarding claims 6 and 7, all conventional surfactants can be included in the process of McCarthy as long as they can be effective surfactants. Therefore, the claimed ethoxylated acetylenic diols are not ruled out.

Regarding claim 8, fluoroolefins such as TFE can be specifically used in the process of McCarthy.

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Regarding claims 9 and 10, the resulting fluoropolymer dispersions made by McCarthy may be used in resin and coating applications on various substrates.

Regarding the process in claim 11, the Examiner indicated that McCarthy's stable aqueous self-dispersible fluorinated copolymer dispersion prepared from above may be up to 48% polymer solids.

With regard to the remaining dependent claims 4 and 5, the Office Action states that they "are thereby rejected with the above rejection for claims 1-3 and 6-11."

2. Claims 1 and 8-10 were rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being unpatentable over Oxenrider et al (U.S. Patent No. 5,453,477).

Regarding the limitation of parent claim 1, the Examiner averred that Oxenrider et al disclose preparation of stable aqueous fluorinated copolymer dispersion in the absence of soaps or surfactants due to improved wettability of polymer particles. Oxenrider et al further discloses that copolymers can be made from combination of fluoroolefin(s) and nonfluoroolefin(s). With respect to the claimed particle size of 10-400 nm, the Examiner asserted that Oxenrider et al have disclosed that dispersed particles in the stable aqueous suspension on size of 0.01-1 micron are obtained.

However, the Examiner acknowledged that the reference is silent of the specific properties as VTT of said fluoropolymer dispersion is at least 26° C. In light of the fact that the prior art and the present invention recite (a) substantially identical polymer composition and (b) obtaining the same type of emulsion process, the Examiner stated that a reasonable basis exists to believe that the products of the invention inherently possess the same properties. Since the PTO does not have proper means to conduct experiments, the Examiner noted that the burden of proof is now shifted to applicants to show otherwise.

Regarding claim 8, the Examiner indicated that fluoroolefins such as TFE can be specifically used with CTFE monomer in the process of Oxenrider.

Regarding claims 9 and 10, the Examiner averred that the resulting fluoropolymer dispersions made by Oxenrider may be used in resin and coating applications on various substrates to form a variety of articles.

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3. Claims 2-7 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Oxenrider et al (U.S. Patent No. 5,453,477) in view of McCarthy et al (U.S. Patent No. 5,955,556).

Regarding the limitation of claim 2-7 and 11, which are dependent from or relate to claim 1, the Examiner's discussion of the disclosure of the prior art of Oxenrider for claims 1 and 8-10 in the office action was incorporated by reference. The Examiner's discussion of the disclosure of the prior art of McCarthy for claims 1-11 of the office action was also incorporated by reference. The Examiner acknowledged that Oxenrider is silent about specifically using non-ionic non-fluorinated surfactant. The Examiner averred that McCarthy et al teaches that various types of commercially available surfactants may optionally be pre-charged or batchwise added, and it includes non-ionic non-fluorinated surfactants such as alkylpolyoxyethylene alcohols and the like. The advantage is such addition of conventional surfactants in the preparation of dispersions will effectively improve the stability of aqueous dispersion.

The Examiner stated that polymeric dispersions produced by Oxenrider and McCarthy contain the same type of fluoropolymers, wherein the fluoropolymers can be self-dispersible. Therefore, the Examiner concluded that one having ordinary skill in the art would have found it obvious to modify Oxenrider's process by additionally including commercially available conventional surfactants in the course of polymerization or post polymerization, specifically non-ionic non-fluorinated surfactants such as alkylpolyoxyethylene alcohols and the like as taught by McCarthy with an advantage to obtain more stabilized aqueous fluoropolymer dispersions in an effective way.

Applicants' Response Claim Rejections under 35 USC § 103

Applicants respectfully traverse all three rejections of the present claims under 35 USC § 103.

1. Applicants aver that claims 1-11 are patentable under 35 U.S.C. 102(b) and under 35 U.S.C. 103(a) over McCarthy et al, U. S. patent No. 5,955,556 (hereinafter "McCarthy").

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The present invention is directed to a fluoropolymer dispersion having fluoropolymer particles with an average particle size of 10-400 nm dispersed in water. The dispersion has a solids content of 35-70 by weight and is free of fluorinated surfactant having a molecular weight of less than 1000 g/mol or containing a fluorinated surfactant having a molecular weight of less than 1000 g/mol in an amount of not more than 0.05% by weight based on the total weight solids of said dispersion. The dispersion also includes a non-ionic non-fluorinated surfactant or mixture of non-ionic non-fluorinated surfactants and one or more non-fluorinated anionic surfactants, wherein the amount and nature of the non-ionic non-fluorinated surfactant or mixture of non-ionic non-fluorinated surfactants is selected such that the VTT of the fluoropolymer dispersion is at least 26° C and that the fluoropolymer dispersion is essentially free of aromatic group containing non-ionic surfactants. The present invention is also directed to a method for providing a fluoropolymer dispersion wherein a fluorinated surfactant is reduced prior to upconcentrating the dispersion in the presence of a non-ionic non-fluorinated surfactant, a non-ionic surfactant, or both. It is important to note that the fluoropolymers are not self-dispersible and, in order to achieve the desired particle size range, require a fluorinated surfactant for polymerization. As noted in claim 11 and in the specification, the fluorinated surfactant is reduced or substantially removed from the initial dispersion prior to the upconcentration step.

McCarthy discloses the preparation of a stable aqueous self-dispersible fluorinated copolymer dispersion of up to 48% polymer solids in water in the absence of surfactant due to improved conversion rate of monomer to polymer. McCarthy further discloses that surfactants may optionally be employed to further manipulate particle size, particle number and particle distribution (see column 8, lines 5-10). However, McCarthy fails to teach, suggest, or disclose a fluoropolymer dispersion containing a fluoropolymer produced through emulsion polymerization process that is not self-dispersible. Further, the reference fails to teach, suggest, or disclose a fluoropolymer dispersion possessing the characteristics of the claimed invention.

It is therefore requested that the Examiner reconsider and withdraw the rejection of claim 1 under 35 USC §103. Claims 2-11 each depends from claim 1 and is patentable over the references at least on that basis, and the rejections of these claims should also be withdrawn.

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2. Applicants respectfully submit that claims 1 and 8-10 are patentable under 35 U.S.C. 102(b) and under 35 U.S.C. 103(a) over Oxenrider et al, U.S. Patent No. 5,453,477 (hereinafter "Oxenrider").

Oxenrider, in contrast to the inventive aqueous fluoropolymer dispersion discovered by applicants and defined in claim 1, is directed to suspension polymerization. Oxenrider fails to describe any aqueous emulsion polymerization processes suitable for producing a fluoropolymer dispersion other than the cursory mention of emulsion polymerization as one prior art method of preparing fluoropolymers (see e.g., column 1, lines 43-49). This is the only mention of emulsion polymerization in Oxenrider. Those skilled in the art understand that certain fluoropolymers that are incapable of self-dispersion require the presence of an emulsifier to achieve the smaller particle size (10 to 400 nm). Since Oxenrider only contemplates suspension polymerization, such reference would be improper for rejecting the dispersion claims of the present invention under 35 U.S.C. 103(a).

3. Applicants assert that claims 2-7 and 11 are patentable under 35 U.S.C. 103(a) over Oxenrider in view of McCarthy.

The present invention has been distinguished separately from both McCarty and Oxenrider in the foregoing remarks. Applicants aver that the combination of the two reference would not result in the present invention since McCarthy is directed to self-dispersing fluoropolymers and Oxenrider only contemplates suspension polymerization. Even if combined, the references would not result in the present invention. Further, with respect to claim 11, the references fail to teach, suggest, or disclose the step of reducing the fluorinated surfactant content of a fluoropolymer dispersion wherein the fluorinated surfactant is reduced prior to upconcentrating the dispersion.

Withdrawal of the rejections of claims 2-7 and 11 is respectfully requested.

Applicants acknowledge that the prior art made of record and not relied upon is considered pertinent to the present disclosure. However, the references made of record do form a basis for rejecting the claims of record.

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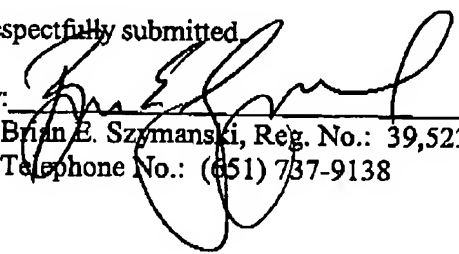
Conclusion

In view of the foregoing remarks favorable reconsideration of the present application and the passing of this case to issue with all claims allowed is courteously solicited.

Should the Examiner wish to discuss any aspect of this application, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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Date

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